U.S. Department of Transportation

Intelligent Transportation Systems Standards Fact Sheet

NTCIP 2301
National Transportation Communications for ITS Protocol (NTCIP) – Application Profile for Simple Transportation Management Framework (STMF)

April 2002

Overview

The National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP) is a family of standards that provides both the rules for communicating (called protocols) and the vocabulary (called objects) necessary to allow electronic traffic control equipment from different manufacturers to operate with each other as a system. The NTCIP is the first set of standards for the transportation industry that allows traffic control systems to be built using a "mix and match" approach with equipment from different manufacturers. Therefore, NTCIP standards reduce the need for reliance on specific equipment vendors and customized one-of-a-kind software. To assure both manufacturer and user community support, NTCIP is a joint product of the National Electronics Manufacturers Association (NEMA), the American Association of State Highway and Transportation Officials (AASHTO), and the Institute of Transportation Engineers (ITE).

The NTCIP family of standards is a joint project of the following standards development organizations:

American Association of State Highway and Transportation Officials (AASHTO)

Institute of Transportation Engineers (ITE)

National Electrical Manufacturers Association (NEMA)

(Contact information is shown at the end of this fact sheet)

To obtain a copy of this standard, please contact:

Global Engineering Documents
Web site: http://global.ihs.com

Publication Date: March 2002

Prior to the establishment of the NTCIP, traffic management centers used a number of proprietary protocols to exchange information with field devices such as traffic signal controllers and dynamic message signs. The goal of all NTCIP standards is to identify a common set of non-proprietary communications protocols that address requirements for center-to-center and center-to-field communications and promote interoperability.

What is this standard for?

This standard, **NTCIP 2301 – Application Profile for Simple Transportation Management Framework (STMF)**, specifies base standards and protocols that are to be used to provide specific communications functions and services. It addresses layers 5 (session layer), 6 (presentation layer), and 7 (application layer) of the Open Systems Interconnection (OSI) Reference Model (ISO/IEC 7498), a seven-layered model that describes the basic functions and services of communication protocols.

This standard specifies three different aspects of standardization. The first aspect is in specifying the requirements for identifying, organizing, and describing information to be transferred. The second specifies the methods for exchanging that information between an end-application and the communication protocol. The third defines the procedures for encoding the information for transmission by a transport profile.

Who uses it?

This standard should be used by equipment manufacturers, systems integrators, and transportation agency personnel. Manufacturers and integrators should understand the specific implementation and operational requirements that it defines. Specification writers and acceptance testers can also find this standard useful, since it defines a profile implementation conformance specification (PICS). Manufacturers, integrators, and users can use this standard as:

a. A checklist to reduce the risk of failure to conform to the standard through oversight;
b. A detailed indication of the capabilities of the implementation;

c. A basis for initially checking the possibility of inter-operating with another implementation; and
d. The basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

How is it used?

This standard is used as a "road map" on how to combine various standards and protocols into a coordinated set of functions and procedures to enable interoperable information transfer. For information definition, it references the Internet's structure and identification of management information (SMI - RFC 1155) and extends it to cover transportation-related information. To exchange information, it cites use of the Internet's simple network management protocol (SNMP - RFC 1157) and a new, transportation-specific protocol referred to as the simple transportation management protocol (STMP - NTCIP 1101). For encoding information, it references the ISO/IEC 8825 ASN.1 basic encoding rules (BER) and a new NTCIP protocol for octet encoding rules (OER - NTCIP 1102).

Scope

This standard is applicable to transportation devices and management systems that are typically part of an ITS project. As an application profile, it specifies a combination of standards and protocols applicable to the application, presentation, and session layers (Layers 7, 6, and 5) of the OSI Reference Model. It is intended to provide message authentication, information management, and data representation services for devices and management stations. It addresses the interface between the communications stack and the end application.

Related documents

To accommodate the broad scope of this standardization effort, the NTCIP has been divided into numerous individual standards. A detailed list of related documents is available on the **NTCIP 9001 – NTCIP Guide** fact sheet. (The NTCIP Guide is also available on-line at www.ntcip.org).

IAB STD 3 – RFC 1122: 1989, Internet Architecture Board (IAB) Requirements For Internet Hosts - Communication Layers, RFC 1123: 1989, Requirements for Internet Hosts - Application and Support

IAB STD 15 – RFC 1157: 1990, IAB Simple Network Management Protocol

IAB STD 16 – RFC 1155: 1990, IAB Structure and Identification of Management Information for TCP/IP-based Internets, RFC 1212: 1991, Concise MIB Definitions

IAB STD 17 – RFC 1213: 1991, IAB Management Information Base

IAB STD 50 – RFC 1643: 1994, IAB Definitions of Managed Objects for Ethernet-like Interface Types

ISO/IEC 7498-1:1994 – Information technology - Open Systems Interconnection, Basic Reference Model: The Basic Model

NTCIP 1101 – Simple Transportation Management Framework (STMF)

NTCIP 1102 – Octet Encoding Rules (OER)

NTCIP 8003 – Profile Framework

American Association of State Highway and Transportation Officials (AASHTO)
444 N. Capitol Street, NW
Washington, DC 20001
Tel: (202) 624-5800 Fax: (202) 624-5806
Web site: www.aashto.org

Institute of Transportation Engineers (ITE)
1099 14th Street NW Suite 300 West
Washington, DC 20005
Tel: (202) 289-0222 x 131
Fax: (202) 289-7722
Web site: www.ite.org

National Electrical Manufacturers Association (NEMA)
1300 North 17th Street
Arlington, VA 22209
Tel: (703) 841-3200 Fax: (703) 841-3300
Web site: www.nema.org

041202